CropPest Ontario

Agriculture Development Branch
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"IN THIS ISSUE"

- My Soybeans are Wilting!
- It's a Lepidoptera Summer!
- Rain and Spider Mites
- Summer Seeding Oats for Extra Forage
- SWAC 2013 Dates
- Take another Look at the New Cover Crop Decision tool for Ontario

My Soybeans are Wilting!

Albert Tenuta, Field Crop Plant Pathologist, OMAFRA, Ridgetown

In Ontario there are many root/stem diseases which cause wilting symptoms in soybeans. With the hot, dry conditions this year over much of the province some of these diseases such as stem canker, Fusarium wilt, charcoal rot have taken advantaged of the additional stress.

Fusarium wilt or blight of soybeans can affect soybeans at any stage of development and is very apparent in southwest. It is caused by the very common soil-borne fungus, Fusarium oxysporum which is different to *Fusarium virguliforme* which is responsible for Sudden Death Syndrome (SDS). Fusarium oxysporum causes a wilting of the soybean plant and is often misdiagnosed as Phytophthora root rot or stem canker as well. Affected plants have a wilting of the stem tips and the upper leaves are scorched. The middle and lower leaves can turn yellow or have pale (dull) yellow spots. In severe cases the leaves will dry up and drop prematurely leaving the petiole behind. The leaf

....continued on page 2

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symptoms are different from SDS or brown stem rot where distinct yellow speckling or spotting between the veins (interveinal chlorosis) occurs and as the disease progresses these areas become larger and in severe cases the entire area between the veins becomes brown (necrotic) and dry.

Unlike Phytopthora there also is no evidence of a stem lesion or external decay that goes above the soil line. Cutting the roots and stems lengthwise will reveal a browning of the vascular tissue and pith. This may be confused with early-season brown stem rot. Fusarium infested roots often have red, orange or white mycelium visible.

Figure 1. Stem canker lesion. Note lesion can girdge stem or be found on one side.

Stem Canker symptoms are often described as a general yellowing of the top leaves of the plant with dark reddish-brown sunken cankers at the nodes. The lesion may extend several inches, often on one side but does not usually extend down as far as the soil line (different then Phythophthora wilt). In severe cases however the lesion may cover the entire length of the stem but in most cases there will be a green section of stem remaining at the soil line. A cross section of the stem will reveal a slight browning at the nodes at first followed by complete disintegration of the stem in severely infected plants. The sudden wilting of the plants and the stem canker can be confused with Phytophthora root rot as well as Fuarium wilt.

Besides the yellowing of the leaves and stem lesion, stem canker can cause a "top dieback" especially later in the season. In this case, the upper four to six internodes or branches of the plant become dark brown and as the name implies the top dies (wilts). Soybean plants may become more susceptible as the plants go through physiological changes due to flowering.

The fungus responsible for northern stem canker (*Diaporthe phaseolorum* var. *caulivora*) survives in crop residues and is therefore, influenced by not only rotation but tillage management practices. It is suspected the re-emergence of stem canker in the northern U.S. and Ontario is due not only to more soybeans and less tillage but possibly an increase in susceptible varieties being grown.

Charcoal rot is one disease which you may not be aware of since it only really shows up when the weather is very hot and dry and occurs predominantly in southwestern Ontario. Although the fungus responsible for charcoal rot (Macrophomina phaseolina) infects early it is not usually until late July or August for symptoms to become obvious but with an early start this year symptoms started early.

Look for tiny, round black structures (microsclerotia) produced inside and on the surface of the taproot and lower stems which often have a grayish appearance. If you split the lower stem/root, you will find black/dark streaks or staining of the tap root. Infected plants will

wilt and are often stunted with yellow leaves which can be confused with drought or other wilt diseases.

Why this year?

The wilt and other root rot diseases are most problematic when soybeans are under water, heat and root stress. In addition, soybean cyst nematode can further stress an already compromised plant and allow easy access for many soil-borne root pathogens. Stress can interfere with the normal activity of the plant's root system and therefore, will affect growth and potentially increase root diseases. Stunting, overall poor growth and wilting are all symptoms of root stress. Root stress will also often resemble nutrient deficiencies.

Figure 2. Grey discoloration and black streaking of stems is typical of charcoal rot infection. (Photo by XB Yang)

Figure 3. Wilt symptoms of soybeans in field can be caused by a number of different pathogens.

It is important to remember every field is different and many of these diseases can occur in the same field. For example Dr. Terry Anderson (retired AAFC Pant Pathologist in Harrow) who has been graciously helping with a new GFO and CAAP funded seedling disease project found the following breakdown of fungi from two fields showing wilt symptoms in Essex county. The percentage of plants infected in field one was – Fusarium (93%) and charcoal rot (36%) and in field two Terry found Fusarium (25%), charcoal rot (25%), Phytophthora (25%), stem canker (8%) and Pythium 8%.

It is important for producers to scout their fields and identify problem fields now and to harvest. This will assist in the selection of resistant varieties if available as well as other management options. Fungicide seed treatments have been shown to reduce early infections but will not help with later season infections. Foliar fungicides may be effective for stem canker if applied before disease develops but again results have been inconsistent and they won't help with charcoal rot or Fusarium wilt. Crop rotation with non hosts such as corn and wheat (small grains) can reduce these wilt pathogens but only to a degree since some can infect other crops and weeds as well. Reducing the amount of infested soybean residue on the soil surface is another management tool to consider. We can't change the weather but we can minimize risk of these and other diseases from occurring in the future.

It's a Lepidoptera Summer!

Tom Cowan, Entomologist, OMAFRA, Ridgetown

The butterfly enthusiasts had a good spring this year with the early arrival of the red admiral butterfly and large flights of other species. Unfortunately for us, that also meant some pests also arrived in great number

Figure 1. Thistle Caterpillar (Photo Credit: Nicole Weber, Cargill)

Speaking of pests has anyone seen this caterpillar in soybeans? This is the larval stage of the painted lady butterfly called a thistle caterpillar or sometimes the painted lady caterpillar. They have a wide host range but usually like to feed on thistles and the odd soybean plant. This year there has been quite a few reports about this insect showing up in soybean fields in numbers much higher than normal. The larvae are easy to spot since they tend to use silk to bind leaves together to make a nice hiding place where they feed. Usually you will find them on the top leaves of the soybeans plants.

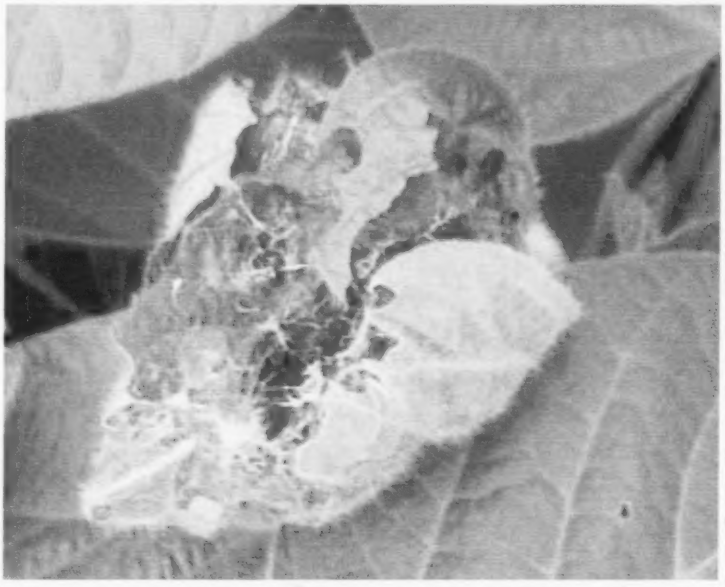

Figure 2. Thistle Caterpillar Damage (Photo Credit: Christine Brown, OMAFRA

The painted lady butterfly flies north from the southern US to establish temporary spring/summer populations here in Ontario but does not survive the winter. Along with the true armyworm, there was a much larger than normal flight of these butterflies this spring which lead to higher than normal egg laying in soybeans. This is still a sporadic pest showing up in a few hot spots in various counties north of Lake Erie.

There are no registered insecticides in Ontario to control this insect but fortunately, damage tends to look a lot worse then it is. Reports from the field seem to indicate that loss of total plant leaf area is around 10% or less.

There have been other reports of defoliating insects such as the red headed flea beetle and Japanese beetle in soybeans. Thresholds for defoliating insects are based on the amount of leaf feeding at certain growth stages of the plant. Defoliation is often overestimated so make sure to take leaf samples from the middle of the canopy to get a good estimation of the actual damage being done. Scouting techniques and thresholds for leaf feeding can be found in the following link to the Agronomy Guide: http://www.omafra.gov.on.ca/english/crops/pub811/13soybean.htm#defoliating

Rain and Spider Mites

Tom Cowan, Entomologist, OMAFRA, Ridgetown

Since we've been getting a bit of rain across the province in the last week I've been asked about how the rain will affect spider mite populations in soybeans. Rains are very beneficial to help keep populations of spider mites down but don't assume that because it rained our spider mite problems are over. If mite populations in the field have been quite high, one rain event will not be enough to reduce high mite numbers below threshold. We will need some continuous cooler weather with higher humidity to give the beneficial fungi a chance to make a dent in the mite numbers. I've seen some very healthy mite populations this week in fields that had a good amount of rain on the weekend and with continued warm weather, these populations are likely to continue to increase. To determine if your mites are still alive, check to see if they are still moving around on the leaves. If the mites are not moving even when disturbed then they are most likely dead.

Mite Control Options

Insecticides registered for spider mite control in soybeans are Cygon 480 and Lagon 480, both contain dimethoate as the active ingredient and typically give about a 7 day residual for spider mite control. Drought stress will affect absorption and trans-location of the insecticide in the plant so even though this active is systemic, good coverage is essential for the product to be effective. Using higher water volumes can help improve coverage of leaf area and will give the product a better chance to work. Dimethoate does not control spider mite eggs so in situations where there is a heavy infestation a follow up treatment may be needed when the eggs hatch.

Figure 1. Heavy spider mite damage along field edge

Stress on soybean plants during pod fill can affect yield so if mite populations are above threshold then treatment may be necessary. The entire field may not need to be sprayed; perimeter treatment or treatment of hotspots may be all that is needed to get the problem under control.

Summer Seeding Oats for Extra Forage

Joel Bagg, Forage Specialist, OMAFRA, Lindsay
Peter Johnson, Cereals Specialist, OMAFRA, Stratford

Seeding oats in late-July or early-August following wheat for an early-October harvest can be a useful low-cost option for extending forage supplies. Oats can make good feed when harvested at the correct stage of maturity and made into "oatlage" or baleage. Oats are more frost tolerant in the fall than sorghums, and can continue growth after some frost. The challenges can sometimes be lack of adequate moisture in August, and having dry enough weather in October for adequate wilting. Oats can also be pastured if fence is available.

Seeding

Oats normally require about 60 days of growth following germination to reach the boot-stage. However, summer seeded oats tend to mature more slowly as days shorten in the fall, so may require an additional 10 days or so. Oats seeded on August 1st would typically be ready to harvest in early-October.

Many prefer to no-till drill oats into wheat stubble to save time and moisture. Volunteer wheat will also provide forage, although winter wheat will not form a stem in the fall to provide significant growth. Alternative seeding methods are to broadcast the oats and then incorporate them with a light disc or cultivator, or to seed into a prepared seedbed using a conventional drill. Summer seeded oats are commonly seeded at about 100 lbs per acre (3 bu/ac).

Varieties

There are oat varieties specifically marketed as "forage" varieties. They tend to be higher yielding, later maturing, and with less disease resistance. However, Ontario does not have a third-party forage oat variety testing program to evaluate variety performance and seed company claims. Many producers use double-cleaned or weed-free bin-run oats to minimize costs.

Forage Quality

Stage of maturity for optimum forage quality is at the "boot-stage" (head beginning to emerge from leaf whirl). Harvested at the boot-stage, fall grown oats are highly digestible and palatable. With cooler temperatures and shorter days, fall grown oats often have higher digestible energy than spring seeded oats. Boot-stage oatlage is excellent feed for dairy heifers and beef cows, but may not be adequate to include in high producing dairy cow rations. At the boot-stage, cereals are typically about 16.5% crude protein and 54% NDF with good fibre digestibility. Once headed, nutritional quality declines rapidly. Harvesting at the headed or early-milk stages will provide more yield, but will have much lower digestible energy and protein. Wet chemistry rather than NIRS laboratory analysis of cereal forage is recommended.

Harvest Moisture

Drying oats to the desired harvest moisture during October weather can be challenging. Days are cool and short, dews are heavy, and "rain delays" while lying in a swath can be significant.

Oats, Barley, Triticale, Peas?

Many find that oat forage is the most palatable of the cereals. Some producers avoid barley and triticale because of concerns about feeding the awns. Oats tend to out-yield barley when establishment conditions are poor. Triticale seed is expensive and hard to source. At the same stage of maturity, oats, barley and triticale are very similar in feed quality.

Cereal-pea mixtures are popular as a spring seeded companion crop. Peas added to cereals improve forage quality, but do not necessarily increase yields. Summer seeded peas dislike hot, dry conditions even more than cereals. Pea growth is often quite variable depending on moisture. Peas are more succulent and higher in moisture than oats, and can be very difficult to wilt in the fall. Pea mixtures may lie in the swath for an extended period of time with the risk of being rained-on. Lush cereal-pea mixtures can be difficult to cut. Seed is more expensive. Despite these concerns, peas improve forage quality where meeting high nutritional requirements is a priority, such as for high producing dairy cows. If a cereal-pea mixture is sown to improve feed quality, at least 50% should be peas, with a total seeding rate of about 110 - 120 lbs/ac. This will typically increase crude protein by 2 – 4% and decrease NDF by 2 – 4.5% over straight cereals.

Fertilizer, Insects and Disease?
Nitrogen (N) is essential for reasonable forage yields. Manure or fertilizer can supply N, but growth without nitrogen will be very disappointing. Apply 50 lbs/acre of actual N for adequate growth before tillering (3 weeks after germination). P and K will be removed in the forage, but it is not essential to replace or add any P or K during the growth of the emergency forage crop.

Crown rust is a potential problem in summer seeded oats. Crown rust can defoliate the oat crop and decimate yields if infection is severe. Monitor and apply a fungicide if disease levels warrant. Refer to OMAFRA Publication 812, Field Crop Protection Guide www.omafra.gov.on.ca/english/crops/pub812/4ocrust.htm.

Summer seeded cereals are more susceptible to aphids, which in turn vector the disease Barley Yellow Dwarf Virus (BYDV). BYDV can severely stunt the crop, and dramatically reduce forage yields. Cruiser seed treatment offers early-growth control of aphids.

Fall Rye, Winter Wheat or Winter Triticale?
If forage is needed next spring rather than this fall, winter cereals are an option. These winter-annual crops will out-yield summer seeded annual cereals harvested in the fall. Fall rye grown for silage can provide a significant amount of feed, but must be harvested at the correct stage of maturity for forage quality (flag-leaf to boot-stage). This will typically occur in early-May, and then another crop can be planted. Little research data exists for winter triticale grown as a forage in Ontario. Some New York research suggests winter triticale yields can be higher than rye or wheat. (Fall Rye For Silage www.omafra.gov.on.ca/english/crops/facts/fallrye.htm)

Other Forage Options?
Do not ignore wheat fields that have red clover underseeded. Red clover makes excellent feed for high producing dairy cows. Refer to "Red Clover Haylage" www.omafra.gov.on.ca/english/crops/facts/info_redclover_haylage.htm.

Other species, such as annual ryegrass or sorghum-sudan grass, have not had good success under Ontario conditions when planted after wheat harvest.

Yields Highly Variable
Winterkill, frost damage, insect damage and dry weather have all taken the toll on forage production this year. Forage yields are expected to be significantly reduced, and many farmers are concerned about having adequate forage supplies to meet the needs of their livestock. Yields of summer seeded cereals are highly variable, but under good conditions dry matter yields are typically in the 1 – 1.75 tonne/acre range or more. In years of tight forage supplies, every bit counts. Cereals can be a good low-cost emergency forage option if timely rainfall is received for germination and growth. Of the cereals, oats are the most readily available, and give the best yields and returns for the dollars invested. Peas can be added where higher forage quality is required.

Also refer to "Forage Production From Spring Cereals and Cereal-Pea Mixtures" www.omafra.gov.on.ca/english/crops/facts/98-041.htm.

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Thursday, January 3 and Friday, January 4, 2013

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Southwest Agricultural Conference

Take Another Look at the New Cover Crop Decision Tool for Ontario

Anne Verhallen, Soil Management Specialist, OMAFRA, Ridgetown

Laura Van Eeerd, University of Guelph Ridgetown Campus

Wheat was off early this year – did you take the opportunity to build your soil through planting cover crops? Wondering what you could plant? Wondering about trying a cover crop to grow some quick feed for this winter? Or you may be wondering about trying a new cover crop. Now there is a new on-line tool available to help you decide.

Ontario has worked with the Midwest Cover Crop Council (MCCC) to develop a Cover Crop Decision Tool. The tool allows you to select a cover crop based on what's important to you (county, soil type, objective –building soil organic matter, alleviating compaction, minimizing wind or water erosion, forage, etc.) and provides your top cover crop species. Each cover crop has a profile, specific to Ontario, that outlines how to grow the cover crop and its' potential benefits and limitations, so you can make informed decisions. The tool was developed by an Ontario team of cover crop experts including farmers, university researchers, OMAFRA staff, crop advisors, and seed suppliers to provide options for your growing region. The tool is available at http://mccedev.anr.msu.edu/. It's quick and easy to use, so next time you are surfing the net, check it out. And if you have any suggestions or for more information, please email either Anne Verhallen (anne.verhallen@ontario.ca) or Laura Van Eerd (lvaneerd@uoguelph.ca).

Weather Summary

Location	July 25 - 31, 2012	Temperature (°C)		Rainfall	Heat Units	Total Since May 1	
		Max	Min	(mm)	CHU	Rain	CHU
Outdoor Farm Show	2012	27.7	15.5	9	179.5	187.8	1976
	30 Yr. Avg.	26.1	14.8	25.3	177.2	254.3	1865.8
Windsor	2012	28.7	18.6	24.8	204.4	251.3	2359
	30 Yr. Avg.	27.4	16.4	19.9	189.5	227.7	2038.9
Trenton	2012	27.6	15.3	57	181.6	205	2066.6
	30 Yr. Avg.	25.9	14.6	18.2	175.2	234.6	1789.9
Mount Forest	2012	26.5	13.1	34.9	166.2	148.3	1886.7
	30 Yr. Avg.	25.2	13.8	22.7	168.5	251	1720.6
London	2012	27.8	15.6	21.6	184.7	169.4	2109.9
	30 Yr. Avg.	26.2	15	24.7	178.6	253.2	1887
Hamilton	2012	29.7	16	15.9	187.8	112.6	2036.7
	30 Yr. Avg.	26.3	15.6	21.9	182.4	236.4	1886.7
Ottawa	2012	28.5	15.5	1.8	180.8	136.9	2042.8
	30 Yr. Avg.	26.2	15	20.2	178.4	261.3	1870.4
Elora	2012	27.3	14	24.1	174.3	126	1900.5
	30 Yr. Avg.	25.7	14.1	24.4	171.6	250.7	1774.2
Peterborough	2012	27.1	14	35.5	173.2	251.3	1901.3
	30 Yr. Avg.	25.7	14.3	19.2	173	238.1	1763.6

WIN Weather Innovations Incorporated

Table Updated Daily at
www.weatherinnovations.com/weather.cfm

This Report includes data from WIN and Environment Canada